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## ORIGINAL ARTICLE

# A new species of *Nidalia* Gray, 1835 from Mid-Atlantic seamounts (Octocorallia, Alcyonacea, Nidaliidae)

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**Abstract** A new soft coral species of the genus *Nidalia*, from seamounts to the south of the Azores Archipelago is described. The main features of *Nidalia aurantia* n. sp. are as following: colony torch-like, a capitulum light orange in colour, not laterally flattened, dome-shaped and not distinctly projecting beyond the stalk, an introvert with sparse sclerites transversally placed, and an anthocodial crown with 13–17 sclerite rows. The new species is compared with its closest congeners. This is the first time that a species of *Nidalia* has been located in the Mid-Atlantic Ocean.

**Keywords** North Atlantic · Seamounts · New species · *Nidalia* · Octocoral

## Introduction

Our knowledge concerning the biodiversity of oceanic seamounts is far from satisfactory. New contributions and records that help us to understand the habitat diversity and geographical range occupied by the different taxa, as well as the possible corridors used by different groups of marine benthic invertebrates in the processes of dispersion and

colonization of new areas (Parker and Tunnicliffe 1994; Rogers 1994) are always welcome.

*Nidalia* Gray, 1835 is one of the eight genera included in the soft coral family Nidaliidae Gray, 1869 (five are in the subfamily Nidaliinae and three in Siphonogorgiinae). This genus was revised by Verseveldt and Bayer (1988), reducing to 12 the number of recognizable species, and summarizing the previous knowledge and references (see Verseveldt and Bayer 1988: 5–8, 48–62).

According to the geographic distribution of the species of *Nidalia*, eight species are present in the Indian Ocean or Western Pacific, while only four have been described from the Western Atlantic (Verseveldt and Bayer 1988).

Three colonies of an undescribed species of *Nidalia* were collected, during the “Seamount 2” cruise on the *R/V Le Suroit*, conducted by the INSU/CNRS/Muséum, (Serge Gofas, Chief scientist, 4 January–13 February 1993), at the seamounts south of the Azores Archipelago, N Atlantic (Atlantis Bank, ca 30°N–30°W). This material is described here, and its relationships with its closest congeners are discussed.

## Methods

As mentioned above, the material studied here was collected during the “Seamount 2” cruise using a Waren dredge (DW). The octocorals were fixed in 5% formalin in seawater, and then preserved in 70% ethanol. Fragments of different parts of the colonies were prepared for study by SEM employing the usual methodology, previously described by different authors (e.g., Bayer and Stefani 1988), and permanent mounts were made for light microscopy observation. About 30 sclerites from each type and part of colony and polyp (crown, introvert, points, surface of the stalk, etc.) were measured, trying to include the

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**Fig. 1** *Nidalia aurantia* sp. nov. **a** holotype, **b** and **c** paratypes. Scale bar 20 mm

complete range of sizes. All sclerite size measurements and illustrations are from the holotype. The colony and sclerite terminology herein mainly follow Bayer et al. (1983). The type material of the new species has been deposited at the Muséum national d'Histoire naturelle (MNHN) in Paris.

## Results

### Order Alcyonacea

Family Nidaliidae Gray, 1869

Genus *Nidalia* Gray, 1835

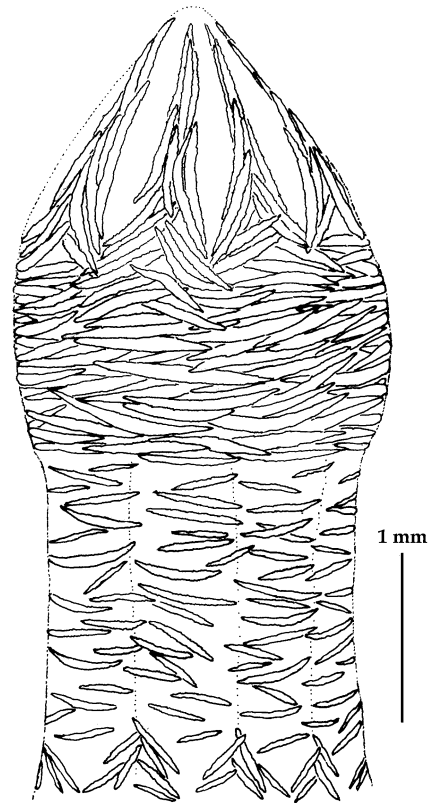
*Nidalia aurantia* sp. nov.

### Type material

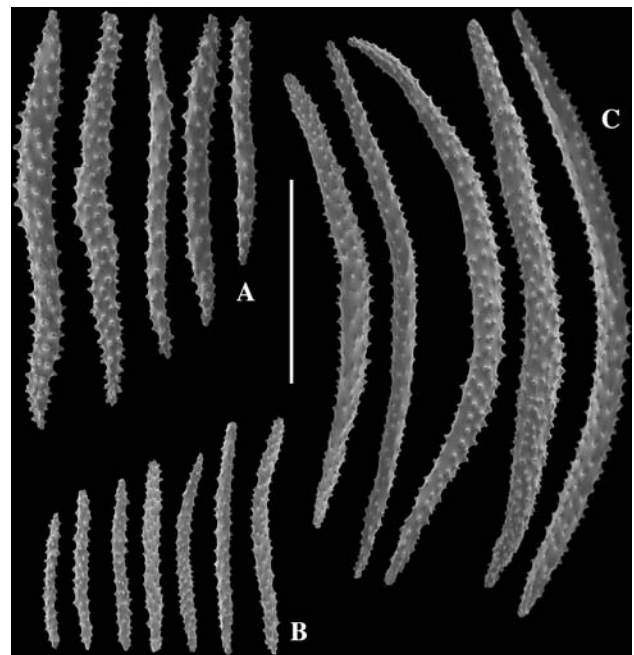
Holotype: MNHN October 2008-0001, “Seamount 2” cruise, stn. DW 258, Atlantis Bank, 33°59.83'N–30°12.15'W, 240–460 m, 2 February 1993, 1 whole colony, 37 mm in length. Paratypes: MNHN October 2008-0002, “Seamount 2” cruise, stn. DW 258, Atlantis Bank, 33°59.83'N–30°12.15'W, 240–460 m, 2 February 1993, 1 whole colony, 8 mm in length; MNHN October 2008-0003, “Seamount 2” cruise, stn. DW 256, Atlantis Bank, 34°06.21'N–30°16.03'W, 340–345 m, 2 February 1993, 1 whole colony, 25 mm in length.

### Description of the holotype (Figures 1a, 2–5)

Colony unbranched, torch-like, 37 mm in length, with elongated stalk about 88% of total colony length. Stalk adhering by one or more points to gravel and fragments of calcareous hydrocorals. Capitulum dome-shaped, oval in section, not distinctly projecting beyond the stalk, 9 mm in maximum diameter, about 16% of total length colony. Gonochoric, developing spermatid cysts up to 0.13 mm in diameter.



**Fig. 2** *Nidalia aurantia* sp. nov. Holotype. Anthocodial armature. Scale bar 1 mm



**Fig. 3** *Nidalia aurantia* sp. nov. Holotype. **a** Sclerites from calyx. **b** Sclerites from introvert. **c** Sclerites from crown. Scale bar 0.4 mm

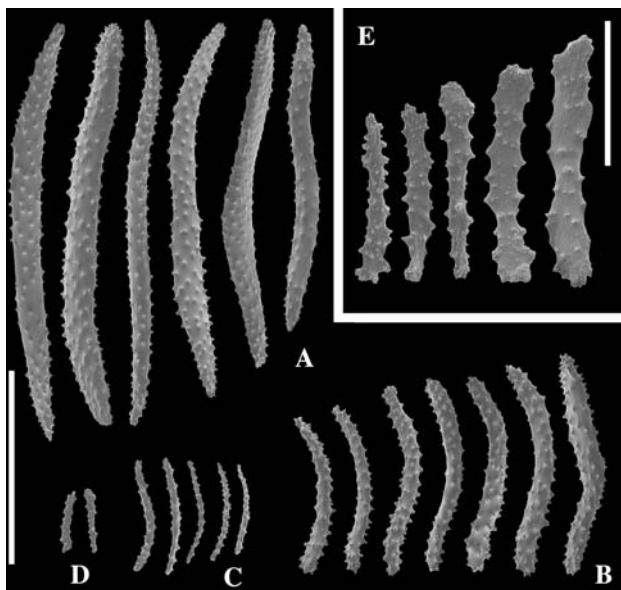
Capitulum with few polyps (about 15). Calyces low with slightly eight-lobed edge with spindles, 0.4–0.86 mm in length (Fig. 3a). Polyps capable of complete retraction.

Anthocodiae only observed in retracted stage. Introvert about 2 mm in length, with regularly distributed slightly curved spindles 0.27–0.5 mm in length (Fig. 3b), mainly following interseptal spaces, shortly arranged *en chevron* proximally. Antocodiae with distinct crown and points. Crown with 13–17 lines of curved spindles, 0.81–1.23 mm in length (Fig. 3c). Each point with 6–9 slightly curved spindles, 0.59–0.9 mm in length (Fig. 4a), proximally arranged *en chevron*, distally arranged parallel to each other. Without intermediate point (secondary points) between principal (interseptal) ones. Tentacles not observed in extended stage, densely filled with curved spindles 0.13–0.45 mm in length (Fig. 4b) along its aboral side arranged *en chevron*, distally placed transversally, 0.18–0.24 mm in length (Fig. 4c). Plates about 0.1–0.17 mm in length (Fig. 4d, e) in pinnules.

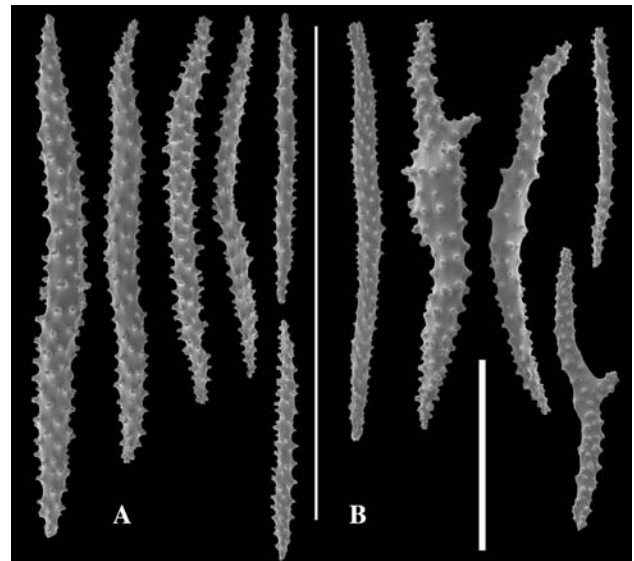
Surface layer of the stalk with spindles, 0.49–1.1 mm in length (Fig. 5a). Interior of the stalk with spindles, sometimes shortly branched, 0.45–0.86 mm in length (Fig. 5b).

#### Variation

The general colonial structure of the paratypes is quite similar to that of the holotype. The stalk is elongated, but shorter than in the holotype. The capitulum is dome-shaped, oval in section, not distinctly projecting beyond the stalk, 5–6.3 mm in maximum diameter, with few polyps (4 and 6 in the two paratype colonies). The calyces and the sclerites form and distribution are as in the holotype.



**Fig. 4** *Nidalia aurantia* sp. nov. Holotype. **a** Sclerites from points. **b** Aboral side of tentacle. **c** distalmost part of the aboral side of tentacle. **d** Plates from pinnules. **e** Plates from pinnules, magnified. Scale bars **a–d** 0.4 mm, **e** 0.1 mm



**Fig. 5** *Nidalia aurantia* sp. nov. Holotype. **a** Sclerites from surface of the stalk. **b** Sclerites from interior of the stalk. Scale bar 0.4 mm

#### Colour

In alcohol the colony is creamy white at the stalk, and light orange at the capitulum and anthocodial armature. All colours in preserved state, shown by all the colonies examined, are due to permanent colours of the sclerites.

#### Etymology

The specific name is derived from the light orange colour of the capitulum in the three examined colonies.

#### Habitat and depth distribution

The colonies examined were collected from a sandy and gravel bioclastic bottom with basalt fragments, depth ranging 240–460 m. With respect to the associated fauna, some living bivalves of the genus *Limopsis*, and some individual brachiopods were also found in the samples.

#### Geographical distribution

At present, *Nidalia aurantia* n. sp. is known only from the Atlantis Bank, a seamount located south of the Azores Archipelago.

#### Discussion

##### Comparison with other taxa

As mentioned above, the genus *Nidalia* was revised by Verseveldt and Bayer (1988), so additional information

about the different anatomical and distributional data of all the *Nidalia* species can be found in that work.

According to the key to species and descriptions given by Verseveldt and Bayer (1988), *Nidalia aurantia* n. sp. is—from a morphological point of view—only comparable to *N. simpsoni* (Thomson and Dean 1931), and *N. dissidens* Verseveldt and Bayer 1988 by sharing the possession of torch-like colonies, a capitulum not laterally flattened, and a number of anthocodial sclerites in the crown greater than ten.

However, *N. aurantia* n. sp. is differentiated from *N. simpsoni* and *N. dissidens* by the type and abundance of the sclerites in the introvert, which are densely filled in the latter two species. These sclerites are curved spindles, up to 0.5 mm in length, and often forming small scattered groups of parallel spindles in *N. dissidens*. They are minute dumb-bell sclerites, 0.08–0.14 mm in length, in *N. simpsoni*; while in *N. aurantia* n. sp. these sclerites are well separated spindles, 0.27–0.5 mm in length, mainly arranged parallel to each other along interseptal spaces.

Furthermore, additional differences can be found in the rest of the anthocodial armature. *Nidalia dissidens* has 20–30 rows of sclerites in the crown, while there are 15–20 in *N. simpsoni*, and 13–17 in *N. aurantia* n. sp. The points of *N. dissidens* are composed of a greater number of pairs of sclerites (10–12 in a row), this number being lower in the other two species (3–5 in *N. simpsoni* and 6–9 in *N. aurantia* n. sp.).

Regarding the colour pattern of the three species in preserved material, *N. dissidens* is creamy white; the overall colour of *N. simpsoni* is brownish orange except for the small sclerites of the pinnules and introvert that are dull orange or reddish orange. *N. aurantia* n. sp. shows a creamy white stalk and a light orange capitulum including the anthocodial armature (Faulkner 1974; Verseveldt and Bayer 1988; present study).

With respect to the geographical distribution of these three species, *N. simpsoni* is from Indonesian Archipelago and Palau Islands, while *N. dissidens* and *N. aurantia* n. sp. are from the Atlantic Ocean, the former from the Straits of Florida, Bahamas and Lesser Antilles, and the latter from south of the Azores Archipelago.

#### Biogeographical remarks

With the discovery of *N. aurantia* n. sp., five species of *Nidalia* have been collected from the Atlantic Ocean. The previously known Atlantic species are: *N. occidentalis*, *N. deichmannae*, *N. dissidens*, and *N. rubripunctata* (for additional bibliographic and anatomical details of these species

see Gray 1835; Utinomi 1954; Verseveldt 1978; and Verseveldt and Bayer 1988).

The majority of the known species of *Nidalia* are distributed in the Indian Ocean and in the occidental sector of the Indo-Pacific region mainly in the Bay of Bengal (see Verseveldt and Bayer 1988). The Atlantic species have been described in the Caribbean region and *N. aurantia* n. sp. in an Azores seamount which means that is the first time that a species of the genus *Nidalia* has been located in the Mid-Atlantic area.

Other octocorals collected during “Seamount 2” cruise are under study. Some colonies of the gorgonians *Paracalyptophora josephinae* (Lindström 1877) and *Corallium maderense* (Johnson 1899), as well as a colony of the well known sea pen genus *Pteroeides*, and some colonies of the soft coral genus *Anthomastus* were also collected.

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